We claim:

1. A method of generating a model of a random field which has directionally varying continuity, comprising:

a) specifying a tentative model for said random field;

b) identifying connected strings of nodes within said model;

c) performing a spectral simulation on each of said strings of nodes;

d) updating said tentative model with data values resulting from said spectral simulations.

2. The method of claim 1, wherein a grid of azimuths is used to identify said connected strings of nodes.

3. The method of claim 1, wherein said model is subdivided into layers, and steps b), c) and d) are performed on a layer-by-layer basis.

4. The method of claim 1, wherein for each of said strings of connected nodes said spectral simulation comprises:

a) determining a phase spectrum from a Fourier transform of said string;

b) specifying an amplitude spectrum which represents the maximum-desired spatial continuity for said string; and

c) inverse Fourier transforming said phase spectrum and said amplitude spectrum to determine updated data values for said nodes in said string.

5. The method of claim 4, wherein one or more of each of said strings is padded with additional data values prior to calculation of the Fourier transform of said string.

6. A method of generating a model of a random field which has directionally varying continuity, comprising:

a) specifying a tentative model for said random field;

b) for each of said layers,

[i] specifying a grid of azimuths for nodes in said model;

[ii] using said grid to identify connected strings of nodes within said model;

[iii] performing a spectral simulation on each of said strings of nodes, for each said string said spectral simulation involving the determination of a phase spectrum from a Fourier transform of said string, the specification of an amplitude spectrum which represents the maximum-desired spatial continuity for said string; and the inverse Fourier transform of said phase spectrum and said amplitude spectrum to determine updated data values for said nodes in said string; and

[iv] updating said tentative model with data values resulting from said spectral simulations.

7. The method of claim 6, wherein one or more of each of said strings is padded with additional data values prior to calculation of the Fourier transform of said string.

8. The method of claim 1, wherein neighboring nodes to each said node in each said string of nodes are identified and further wherein said spectral simulation is multidimensional.

9. The method of claim 6, wherein neighboring nodes to each said node in each of said strings are identified and wherein said spectral simulation is two-dimensional.

10. The method of claim 1, wherein said tentative model is specified from a spectral simulation comprising

a) determination of a phase spectrum from a Fourier transform of a first estimate of said tentative model;

b) specification of an amplitude spectrum for said tentative model; and

c) inverse Fourier transforming said phase spectrum and said amplitude spectrum to determine said tentative model.

11. The method of claim 10, where said amplitude spectrum characterizes the short-range continuity desired in said tentative model.

12. The method of claim 10, where said spectral simulation is applied on a layer-by-layer basis to each of one or more layers of said tentative model.

13. The method of claim 10, where said tentative model is specified from a three-dimensional spectral simulation.

14. The method of claim 13, wherein said identified strings of connected nodes are used to identify curtains of connected nodes, and two-dimension spectral simulation is applied to each of said curtains.

15. The method of claim 1, wherein a grid of dips is used to identify said strings of connected nodes.

16. The method of claim 1, wherein a combined grid of dips and azimuths are used in three-dimensions to identify said strings of connected nodes.